Abstract Submitted
for the DFD07 Meeting of
The American Physical Society

Rayleigh-Taylor instability experiments with precise and arbitrary control of the initial interface shape PIERRE CARLES, Universite Paris 6, Paris, France, ZHIBIN HUANG, ANTONIO DE LUCA, TIMOTHY ATHERTON, MATTHEW BIRD, CHARLES ROSENBLATT, Case Western Reserve University, Cleveland, Ohio — For a gravitationally-driven Rayleigh-Taylor instability, a dense fluid initially sits metastably atop a less dense fluid, a configuration that can be stabilized using a magnetic field gradient when one fluid is highly paramagnetic. On switching off the magnetic field, the instability occurs as the dense fluid falls under gravity. By affixing appropriately shaped magnetically-permeable materials to the outside of the cell, we impose arbitrarily-chosen, well-controlled, and jitter-free initial perturbations on the interface. This technique is used to examine both the linear and nonlinear regimes, including growth rates and nonlinear growth coefficients, as functions of the imposed perturbation wavelength and amplitude.

Charles Rosenblatt
Case Western Reserve University

Date submitted: 26 Jul 2007 Electronic form version 1.4